

REMARKS

Although it is believed that the Melton reference is not prior art to the claimed inventions, the Applicant would prefer to distinguish the Melton reference at this point. Applicant does, however, reserve the right to swear behind the Melton reference at a later point.

Claim 2 has been cancelled.

The 102 rejections based on Melton

Claims 1-2 and 4-5 have been rejected as being anticipated by Melton. This rejection is respectfully traversed. As explained previously, Claim 1 previously specifically required that:

exposed portions of the lead frame form the only externally accessible I/O contacts for a resulting integrated circuit package

In the telephone interview that occurred on June 1, 2006, the Examiner pointed out a concern that possibly this language could be interpreted to read on the leads 16 of Melton because those leads are part of the electrical conduction path to the balls 20 that form the electrical contacts. It is believed that such an interpretation of the original language is not appropriate. However, in an effort to expedite prosecution, the relevant language of independent claims 1 and 7 has been amended to read:

exposed surfaces of the lead frame directly form the only externally exposed and accessible I/O contacts for the package

The quoted language is not believed to change the scope of this clause but is believed to further clarify the point that the exposed lead surfaces themselves are the only externally accessible contacts for the package. It is respectfully submitted that Melton does not describe such an arrangement and that the outstanding 102 based rejections of claims 1-2 and 4-5 must be withdrawn for at least this reason.

The 103 rejection based on Djennas standing alone

Claims 1-2 and 6-10 stand rejected as being obvious over a combination of three different embodiments disclosed by Djennas. These rejections are respectfully traversed. The first two embodiments relied on in the outstanding rejection are lead frame based packages. As acknowledged by the Examiner, neither of these embodiments suggest the use of a removable tape to provide a temporary die supporting surface during a molding process. Rather, the outstanding rejection relies on the combination of the tape 148 used as a temporary die support in the sixth embodiment in an attempt to meet this limitation. This combination is respectfully traversed. Initially, it is pointed out that the sixth embodiment of Djennas refers to a substrate

based arrangement for packaging integrated circuits. The substrate 100 is formed from a non-conductive material (such as PCB – see col. 7, lines 23-25) with conductive traces 104 and 106 provided on opposite sides of the substrate. Within the semiconductor packaging arts, substrate based packaging (e.g. BGA type packages) is well understood to be a very different type of packaging than lead frame based packaging and it is not fair to presume that concepts used in one type of packaging (e.g. substrate based packaging) are appropriate for use in another type of packaging (e.g., lead frame based packaging).

It is noted that both the first and third embodiments of Djennas (i.e., the lead frame based embodiments) specifically contemplate that the leads will emerge from an intermediate portion (thickness-wise) of the package. It is the undersigned's belief and understanding that at the time of Djennas, this type of arrangement was utilized in an overwhelming majority of the available lead frame based packages. In contrast, the pending claims are clearly limited to methods that produce a package that has leads exposed on the bottom surface of the package. This is a very different package arrangement than the conventional lead frame based packages taught by Djennas. It is respectfully submitted that at the time of the present invention, a person of ordinary skill in the art would not have attempted to utilize the die support tape of the sixth embodiment of Djennas in the package of either of the first or third embodiments of Djennas because to do so would completely change the nature of the package. That is, the leads would have to be exposed on the bottom surface of the packages. Although that would be somewhat similar to the structure that would result from the present invention, those skilled in the art at the time would not have been motivated to make that change because the resultant package would no longer be the same type of package. That is, the leads would no longer emerge from the package at the desired location. Accordingly, it is respectfully submitted that the combination relied on in the outstanding rejection is inappropriate and that the outstanding rejections should be withdrawn for at least that reason.

The outstanding office action also offers an alternative combination in which the lead frames of the first or third embodiment are substituted for the substrate of the sixth embodiment. Again, although this would conveniently result in a structure that is somewhat similar to the arrangement that results from the present invention, there is no motivation whatsoever in the reference to make such a combination and the outstanding rejection does not point to (or otherwise articulate) such a motivation. That is not surprising because such a combination would have been against the conventional wisdom at the time of the present invention.

The office action mentions that the Djennas reference teaches that "the external portion of the leads can be in any surface mount or through hole configuration..." It is guessed that possibly the Examiner is asserting that this implies that the configuration could include the type of package that results from the claimed invention. Such an assertion is respectfully traversed. Although it is acknowledged that these types of packages fall within the general class of surface mount packages, it is clear from the specification and drawings that the Djennas reference

doesn't suggest such an approach. Rather, it should be appreciated that Figs. 8 and 10 illustrate standard "surface mount" package configurations and it is respectfully submitted that those of ordinary skill in the art would clearly understand that that is the type of configuration that Djennas was referring to at the time.

Further, it is pointed out that if Djennas had recognized the benefits of the claimed invention, surely he would have mentioned it. The fact that Djennas himself did not recognize (and therefore disclose) the benefits of utilizing a tape to support both a die and a lead frame to form a package with the leads exposed on the bottom surface of the package as required by the pending claims would appear to be strong evidence that the combination relied on in the outstanding rejection is inappropriate and should be withdrawn.

The 103 rejection based on the combination of Melton, Djennas and Ogawa

The outstanding rejection based on the combination of Melton, Djennas and Ogawa is premised on the presumptions that Melton and Djennas teach substantially all of the present invention. As explained above, these presumptions are not correct and therefore, it is respectfully submitted that the outstanding rejection based on the combination of Melton, Djennas and Ogawa must be withdrawn for at least this reason.

Additionally, it is noted that the office action takes the position that the disclosure of Melton would make it obvious to remove the resin film 2 from Ogawa. This position is respectfully traversed. As is described in the paragraph beginning at Col. 2, line 15 of Ogawa, the entire purpose of the relevant portion of Ogawa was to provide a better adhesive bond between the resin and the metal leads so that shear stresses exerted during assembly did not lead to small gaps between the resin film and the leads, which in turn can lead to cracking in the resultant package. Thus it is very clear that Ogawa intended to keep the resin film as a permanent die support feature in the final package and that removing the resin film would entirely defeat the purpose of Ogawa. It is well established that if a proposed modification would render the prior art being modified unsatisfactory for its intended purpose, then, as a matter of law, there can not be a suggestion or motivation to make the proposed modification. MPEP §2143.01(V). The outstanding rejection fails to address this issue. Accordingly, it is respectfully submitted that the outstanding rejection based on the combination of Melton, Djennas and Ogawa must be withdrawn for at least this reason as well.

The Dependent Claims

Claims 4-6 each depend either directly or indirectly from independent claim 1 and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to claim 1. Additionally, some of these dependent claims require additional elements that when considered in the context of the claimed arrangements further patentably distinguish the art of record.

Claims 8 – 10 each depend either directly or indirectly from independent claim 7 and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to claim 1 and 7 discussed above. Additionally, these dependent claims require additional elements that when considered in the context of the claimed arrangements further patentably distinguish the art of record.

Conclusion

In view of the foregoing, it is respectfully submitted that all pending claims are patentable over the art of record and that this case is in condition for allowance. Should the Examiner have any remaining concerns regarding the present application, he is encouraged to contact the undersigned at the telephone number set out below.

Respectfully submitted,
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